

April 17, 2017

Karen Kirchner
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77 West Jackson (SR-6J)
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**Subject: Lusher Street Groundwater Site Field Sampling Plan Addendum 3 Revision 2
For Spot Plume Investigation; additional sampling points
Lusher Street Groundwater Contamination Site, Elkhart, Indiana
Contract No. EP-S5-06-02, Work Assignment No. 136-RICO-05AB**

Dear Ms. Kirchner:

SulTRAC has prepared this letter as a revision to the addendum to the document, "*Field Sampling Plan, Revision 1, Phase IA Remedial Investigation for Lusher Street Groundwater Contamination Site, Elkhart, Elkhart County, Indiana,*" dated August 13, 2010. The original Field Sampling Plan (FSP) was submitted under the Work Assignment (WA) for the Lusher Street Groundwater Contamination Site (Lusher Street Site) from the base period of the contract, WA 036-RICO-05AB. This revision to the Spot Plume Investigation FSP Addendum 3 is based on the U.S. Environmental Protection Agency (EPA)-approved Work Plan for the Lusher Street Site (SulTRAC 2011) as well as all sampling conducted to date under the previous WA.

This revision to the Spot Plume Investigation FSP Addendum 3 serves to address the locations of the additional sampling points and to update the sample counts to reflect the total number of samples that will be collected once field work is complete. During the initial Spot Plume Investigation in January 2017, VOCs were detected above the MCL in the shallow groundwater samples around the former sampling point GW-04 from the Remedial Investigation. Seven additional sampling points will be used to help identify the southern boundaries and the east and west boundaries of the plume:

- Five sampling points will be located along W Hively Ave to bound the plume on the east and west and to try to locate the center of the plume.
- Two additional sampling points will be located along W Mishawaka Rd to serve as up gradient locations to the suspected sources and to provide an indication as to whether the two facilities on the south side of the road may be contributing.

The purpose of this investigation is to bound the plume on the east and west, locate the center of the plume to better understand where the contaminants are coming from, and to indicate whether the two facilities on the south side of W Mishawaka Rd are contributing to the plume. Revisions to the FSP Addendum 3 are in **bold**.

Field Sampling Approach

Based on groundwater sampling results collected during the RI, trichloroethylene (TCE) was detected at a concentration of 3.1 micrograms per liter ($\mu\text{g/L}$) in the shallow groundwater from grab groundwater location GW-04. Although this detection is below the screening level of 5 $\mu\text{g/L}$, there were no other detections of TCE or other VOCs in the groundwater surrounding GW-04 to explain this detection. To verify this result and determine if further contamination exists in groundwater, sampling will be focused in the area surrounding GW-04.

The initial Spot Plume Investigation detected TCE in the shallow groundwater in several locations within the two-block radius surrounding GW-04. At SP-GW-10, TCE was found at a concentration of 13 $\mu\text{g/L}$, at SP-GW-07 TCE was found at a concentration of 8.8 $\mu\text{g/L}$, and at SP-GW-01 TCE was found at a concentration of 8 $\mu\text{g/L}$. These three detections are above the screening level of 5 $\mu\text{g/L}$. Additional sampling will be focused south of the detections on W Hively Ave and W Mishawaka Rd to bound the plume on the east and west and to the south.

Additionally, samples will be collected for 1,4-dioxane analysis. 1,4-dioxane is an emerging contaminant, and historically has been used as a stabilizer and corrosion inhibitor in some chlorinated solvents, particularly 1,1,1-trichloroethane, which has previously been identified at the Lusher Street Site. 1,4-dioxane has also been used as a solvent in numerous processes and products. The preferred CLP method for the analysis of 1,4-dioxane is to treat it as a semi-volatile organic compound (SVOC), and use the CLP SVOC method. This is because 1,4-dioxane shows poor purge efficiency, and therefore does not respond well to the purge-and-trap process used for CLP VOC analysis.

GRAB GROUNDWATER SAMPLING:

Grab groundwater samples were collected within the public rights-of-way within an approximate two block radius of former sample location GW-04 (Figure 1) in January of 2017. An additional five sampling points will be located on W Hively Ave to bound the plume on the east and west and attempt to locate the center of the plume. Two additional sampling points will be located on W Mishawaka Rd to see if the plume is originating north or south of Mishawaka Rd (Figure 2).

SulTRAC will use a direct-push drill rig to install temporary groundwater sampling points. Groundwater will be purged and sampled using low-flow techniques until the turbidity is less than 50 nephelometric turbidity units (NTUs), with a **peristaltic pump**. SulTRAC will collect two samples from each sample point, at the water table and 5 to 10 feet below the water table in the shallow groundwater. All samples will be analyzed for VOCs and 1,4-dioxane.

GROUNDWATER MONITORING WELL SAMPLING:

Groundwater monitoring well samples will be collected from four existing groundwater monitoring well clusters surrounding the former sample location GW-04 (Figure 1), MW-001, MW-003, MW-021, and MW-111. Only the shallow or water table wells within each cluster will be sampled (MW-001-S, MW-003-WT, MW-021-S, and MW-111-S), because the previous concentrations of VOCs were detected in the shallow sample from GW-04. SulTRAC will use low-flow techniques to purge and sample the monitoring wells. Samples will be collected after the well water has stabilized. All samples collected will be analyzed for VOCs and 1,4-dioxane.

PRIVATE RESIDENTIAL WATER WELL SAMPLING:

Groundwater samples will be collected from up to nine private residential water wells on neighboring properties, based upon each property owner granting access. Private residential well sampling will be conducted to investigate, if any, impacts to the groundwater drinking water from the possible "spot plume." Based on information provided by EPA, private drinking water wells are known to be present at the following nine properties:

Number	Street
Non-Responsive	Leininger Avenue
	Borneman Avenue
	19 th Street
	Markle Avenue

SulTRAC will contact the property owners prior to fieldwork to attain access agreements for SulTRAC to sample the private residential wells. Properties with private residential wells that grant access will be sampled. All samples collected will be analyzed for VOCs and 1,4-dioxane.

Field Sampling Procedures

The following sections describe detailed sampling procedures to obtain the data needed for completion of the Remedial Investigation/Feasibility Study (RI/FS).

GRAB GROUNDWATER SAMPLING:

Grab groundwater sampling will be performed using a direct-push drill rig with a groundwater sampling set-up. The drill will be advanced in 3 to 5 -foot intervals to the water table, depending on the tooling used. Grab groundwater sampling will occur at the water table (assumed to be at 10 feet below ground surface [bgs]) and within the shallow groundwater, approximately 5 to 10 feet below the water table. Grab groundwater samples will be collected in accordance with the Low-Flow Groundwater Sampling procedures, as detailed in the FSP Revision 1 Appendix A-2, SOP-015 (SulTRAC 2010). Geochemical parameters will be collected from each sampling interval using a flow-through cell with pH, temperature, conductivity, oxidation reduction potential (ORP), dissolved oxygen (DO), and turbidity capabilities prior to sample collection. The water will be purged and the geochemical parameters will be recorded at 5-minute intervals. The water will be considered fresh water from the aquifer after three successive measurements of geochemical parameters at 5-minute intervals fall within the following ranges: ± 0.1 standard unit for pH, $\pm 0.5^{\circ}\text{C}$ for temperature, ± 3 percent for conductivity, ± 10 millivolts for ORP, and ± 10 percent for DO and turbidity (see SulTRAC 2010 Appendix A-2, SOP-014 and SOP-015).

All grab groundwater sampling locations will be logged in the logbook. For each grab groundwater sampling location, the following information must be included in the logbook or a on field form: site name, project name, grab groundwater sampling location number, drilling method, boring diameter, well casing diameter, depth to water, date started, date completed, geologist's initials, geologic materials encountered, drilling subcontractor name, and location sketch (with adequate information to find the grab groundwater sampling location if warranted) with a north directional arrow. During the actual drilling and grab groundwater sampling activities, the following information should be collected at each grab groundwater sampling interval: the time, depth, groundwater flow rate, purge time, and geochemical parameters of stabilized groundwater; samples collected will be recorded in the logbook or on a field form.

GPS coordinates will be recorded for each sampling location. Each sampling location will be photographed, and photographs will be archived.

Samples will be collected directly into appropriate sample containers (see Method Analysis Section). At each location, groundwater samples will be collected for analysis of VOCs and 1,4-dioxane. **1,4-dioxane samples will be collected first. The tubing will then be pulled and the VOAs will be filled from the deep end of the tubing. With this method there is less of a possibility to volatilize the compounds.** Samples will be immediately placed into an iced cooler and maintained at a temperature of $4 \pm 2^{\circ}\text{C}$

without freezing until they are transported to the laboratory. All samples will be sent to an off-site Contract Laboratory Program (CLP) laboratory under standard chain-of-custody (COC) protocols.

GROUNDWATER MONITORING WELL SAMPLING:

Four existing groundwater monitoring wells will be sampled for VOCs and 1,4-dioxane using a bladder pump and low-flow techniques. New tubing will be used for each of the monitoring wells. The Monitoring wells to be sampled are MW-001-S, MW-003-WT, MW-021-S, and MW-111-S.

Groundwater monitoring wells will be purged, to remove stagnant water, until groundwater is considered stable prior to sampling. The well water will be considered stabilized after three successive measurements of geochemical parameters at 5-minute intervals fall within the following ranges: ± 0.1 standard unit for pH, $\pm 0.5^{\circ}\text{C}$ for temperature, ± 3 percent for conductivity, ± 10 millivolts for ORP, and $\pm 10\%$ for DO and turbidity (see SulTRAC 2010 Appendix A-2, SOP-014 and SOP-015).

The following information will be recorded in the logbook at each groundwater sampling location: date and time, temperature and general weather conditions, depth to water measured from the surveyed top of the well casing, depth to bottom of the well measured from the surveyed top of the well casing (see SulTRAC 2010 Appendix A-2 SOP-014 and SOP-015).

Sampling will be performed using the same equipment used for purging. All field measurements will be documented in the logbook. At each location, groundwater samples will be collected for analysis for VOCs and 1,4-dioxane. Samples will be directly poured into appropriate glass containers. Samples will be immediately placed into an iced cooler and maintained at a temperature of $4^{\circ} \pm 2^{\circ}\text{C}$ without freezing. All samples will be sent to an off-site CLP laboratory under standard COC protocols.

PRIVATE WATER WELL SAMPLING:

SulTRAC is proposing to sample all accessible identified private water wells within the investigation area. Each sample will be collected directly from the flow stream, in accordance with the sampling approach detailed below.

All private water wells will be purged prior to sampling to ensure that fresh water from the aquifer is being sampled. Groundwater samples collected from private residential wells will be collected directly from (preferably) an outdoor spigot, or, if an outdoor spigot is not available or useable, an indoor faucet after the removal of any aerator(s), if present. The objective is to collect a sample of the water prior to any in-house treatment (filter, softener, aerator) which may be present. Note that the purge time does not start until the well pump is running. If available, groundwater samples will be collected from a sampling point such that groundwater has not been filtered through the household water softener or other treatment device. Geochemical parameters will be collected from each residential well, using a flow-through cell with temperature, conductivity, ORP, DO, and turbidity capabilities, prior to sample collection. Field parameters will be recorded every 5 minutes to see if they have stabilized prior to sample collection. The field parameters should be recorded until three consecutive readings are stable or 30 minutes have passed, whichever occurs first. The spigot or faucet must be open for a minimum of 15 minutes prior to sample collection.

GPS locations will be recorded for each sampling location. Each sampling location will be photographed, and photographs will be archived. The sample collection method, date, time, ambient temperature, visual water characteristics, and total time of well purge will be documented in the logbook (refer to SulTRAC 2010 Appendix A-2, SOP-014 and SOP-015).

Samples will be collected directly from the water spigot or faucet. All field measurements will be documented in the field logbook and/or a dedicated form. The field notes will indicate the location (outdoor spigot, indoor faucet along with room) from which the sample was collected. Samples will be collected directly into appropriate glass containers (see Method Analysis Section). At each location, samples will be collected for analysis for VOCs and 1,4-dioxane. Samples will be immediately placed into an iced cooler and maintained at a temperature of $4 \pm 2^{\circ}\text{C}$ without freezing until they are transported to the laboratory. All samples will be sent to an off-site CLP laboratory under standard COC protocols.

Decontamination and Investigative Derived Waste

Disposable equipment, such as PPE which may come into contact with contaminants (such as disposable gloves) will not be decontaminated. Disposable equipment will be contained and disposed of as ordinary municipal waste. Non-disposable equipment will be decontaminated. Decontamination will be performed in accordance with SulTRAC SOP 002-3, except that the use of solvents (isopropanol, methanol, or hexane) or acid (dilute nitric acid) are not required.

Due to the low concentrations of contaminants anticipated, based on historical information, purge water from groundwater sampling and decontamination fluids are proposed to be allowed to infiltrate on site. If sample location or weather conditions (such as frozen ground) do not permit this, the liquids will be contained and disposed of to the sanitary sewer system.

Quality Assurance/Quality Control

SulTRAC will collect the appropriate number of field duplicate quality control (QC) samples (one per 10 field samples). Extra volume will also be collected for the matrix spike/ matrix spike duplicate (MS/MSD) (one per 20 field samples). Trip blanks will be included in all sample coolers with VOC vials.

Sample Type	Field Samples	Field Duplicate Samples	Trip Blank Samples	MS/MSD	Total Samples Submitted to Laboratory ²
Grab Groundwater	36	3	3	2	44
Monitoring Well Groundwater	4	1	1	1	7
Private Well	13	1	1	1	16

Method Analysis

Groundwater samples will be analyzed for VOCs using EPA Trace Volatile Organic Analysis (VOA) method CLP-VOA-SOM02.3. Trace VOA samples will be collected in four 40-milliliter (mL) amber glass vials. Samples will also be analyzed for 1,4-dioxane using EPA Low Semi-Volatile Organic Analysis (SVOA) method CLP-SVOA-SOM02.3. Low SVOA samples will be collected in two 1-liter amber glass bottles.

Please note: This addendum to the FSP is for the spot plume investigation only. As discussed previously, the actual location of proposed borings may be adjusted based on utility locations and field conditions. EPA will be consulted should the locations need to be revised. The number of private well samples which will be collected will be dependent on obtaining access to perform the sampling.

SulTRAC appreciates the opportunity to serve EPA on this project and welcomes any comments or suggestions you may have. Please contact me by email at wearle@scst.com or by telephone at (312) 658-1141, extension 12, if you have any questions regarding the content of this letter.

An updated Table B-2 (Sampling Summary) from the QAPP is provided as an attachment, with the revisions in **bold**. **The sample counts highlighted in light blue are the counts that have been updated for Revision 2.** Also provided is **Figure B-5, which shows locations sampled in January and the plume along with the seven new proposed sampling locations.**

Sincerely,

Tracey L Koach for

William Earle, P.E.
SulTRAC Project Manager

cc: Mr. Daniel Ollson EPA CO (letter only)
Ms. Mindy Gould, SulTRAC Program Manager (letter only)
MR. Dean Geers, SulTRAC

Attachments

TABLE A-2: SAMPLING SUMMARY

FIGURE B-5: SPOT PLUME PROPOSED SAMPLE LOCATIONS

**TABLE A-2
SAMPLING SUMMARY**

Sample Type	Sample ID	Matrix	No. of Sampling Locations	No. of Samples per Location	Total No. of Samples per Sample Type	QA/QC Samples			Total No. of Samples ^a			
						Field Duplicates	MS/MSD	Trip/ Equipment Blank	VOC by Field GC	VOC by CLP	SVOC, TAL Metals, PCB, Pesticides by CLP	TOC, Grain Size, Porosity ^g
Private Residential Wells ^b	RW	GW	94	1	94	10	5	8	0	117	55	0
Vertical Aquifer Sampling (VAS)	VAS ^c	GW	18	14	238	24	12	4	238	24	0	0
	VAS-PSA ^d	GW	8	2	16	2	1	1	16	2	0	0
	VAS-PSA ^h	GW	3	4	12	2	1	1	12	2	0	0
Soil Borings ^e	VAS-SO	Soil	25	2	50	5	3	14	0	0	50	10
Monitoring Wells ^f	MW	GW	50	1	50	5	3	10	0	34	16	0
Vapor Intrusion – Groundwater	VI-GW	Groundwater	50	1	50	5	3	6	0	61	0	0

TABLE A-2 (CONTINUED)
SAMPLING SUMMARY

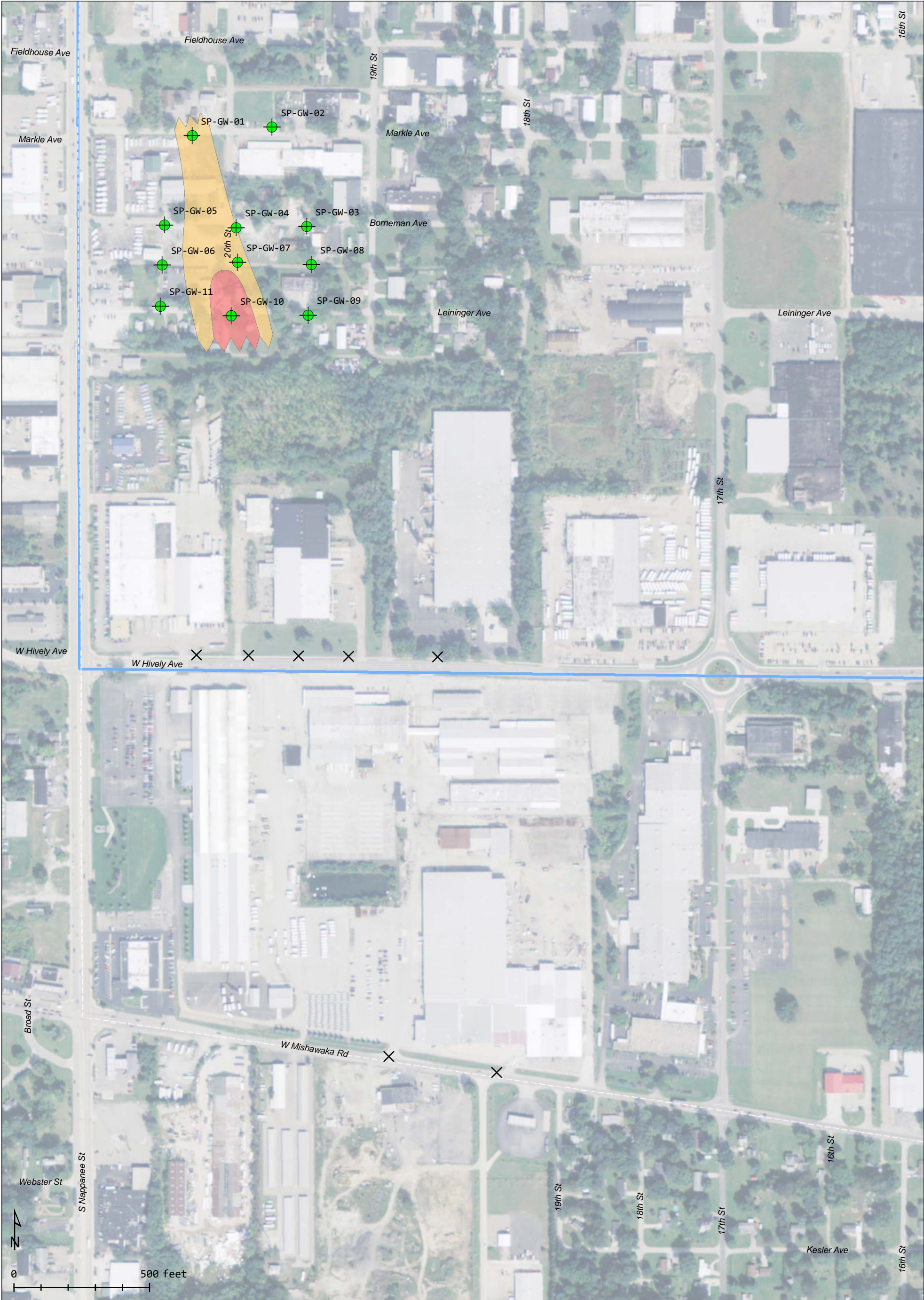
Sample Type	Sample ID	Matrix	No. of Sampling Locations	No. of Samples per Location	Total No. of Samples per Sample Type	QA/QC Samples			Total No. of Samples ^a			
						Field Duplicates	MS/MSD	Trip/ Equipment Blank	VOC by Field GC	VOC by CLP	SVOC, TAL Metals, PCB, Pesticides by CLP	TOC, Grain Size, Porosity ^g
Vapor Intrusion – Soil Gas ⁱ	VI-SG	Air	28	1	80	8	0	0	0	0	0	0
Vapor Intrusion – Sub-Slab	VI-SS	Air	Up to 44 ^j	1-2	66	6	0	0	0	0	0	0
Vapor Intrusion – Indoor Air	VI-IA	Air	Up to 44 ^j	1	44	4	0	0	0	0	0	0
Vapor Intrusion – Ambient	VI-BG	Air	Up to 40 ^l	1	40	4	0	0	0	0	0	0
Spot Plume Grab Groundwater Samples	SP-GW	GW	18	2	36	3	2	3	0	44	41 ^l	0
Spot Plume Monitoring Wells	SP-MW	GW	4	1	4	1	1	1	0	7	6 ^l	0
Spot Plume Private Residential Wells	SP-RW	GW	Up to 13	1	9	1	1	1	0	12	11 ^l	0
TOTAL (for Spot Plume Investigation)					53	5	4	5	0	63	58^l	0

Notes:

TABLE A-2 (CONTINUED)
SAMPLING SUMMARY

- a Total number of samples does not include field duplicate or QC samples.
- b Fifty percent of samples from residential wells will be submitted for a full suite of CLP analyses.
- c Samples will be collected at 10-foot intervals from the groundwater table (assumed to be 10 feet bgs) to a maximum depth of 150 feet bgs.
- d Samples will be collected at 10-foot intervals from the groundwater table (assumed to be 10 feet bgs) to a maximum depth of 30 feet bgs.
- e Up to two soil samples will be collected from each monitoring well location during well installation. Soil samples will be collected only if evidence of gross contamination is observed.
- f Up to two monitoring wells will be installed at each VAS location. Final screen depths will be decided in the field based on depth of groundwater and evidence of contamination.
- g Total organic carbon (TOC), grain size distribution, and porosity analyses will be conducted by subcontract laboratories.
- h Samples will be collected at 10-foot intervals from the groundwater table (assumed to be 10 feet bgs) to a maximum depth of 50 feet bgs.
- i Additional soil gas samples may be collected if the water table is greater than 20 feet bgs.
- j Up to 44 locations are proposed for sub-slab and indoor air sampling. At 50 percent of the sub-slab locations, 2 samples are anticipated to be collected. As part of indoor air sampling, 50 percent of the locations will have a concurrent sub-slab sample collected.
- k Ambient samples will be collected at the rate of one per day of sampling for soil-gas, sub-slab, and/or indoor air samples. Locations will be near the other samples being collected.
- L The only SVOC proposed for analysis during the spot plume investigation is 1,4-dioxane.

bgs	Below ground surface
CLP	Contract Laboratory Program
GC	Gas chromatograph
GW	Groundwater
MS/MSD	Matrix spike/Matrix spike duplicate
MW	Monitoring well
PCB	Polychlorinated biphenyl
PSA	Potential source area
QA/QC	Quality assurance/Quality control
RW	Residential well
SO	Soil
SVOC	Semivolatile organic compound
TOC	Total organic carbon
VAS	Vertical aquifer sampling
VOC	Volatile organic compound



- X Proposed sampling location
- Geoprobe sampling location
- >10 µg/L plume
- >5 µg/L plume
- Site boundary

Exceeds MCL
Detected below MCL
Not detected

Notes:
1) Listed depths are in feet above mean sea level
2) Locations are approximate
3) Basemaps source: Esri



LUSHER STREET GROUNDWATER CONTAMINATION SITE
ELKHART COUNTY, INDIANA

FIGURE B-5
PROPOSED SAMPLING LOCATIONS

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